Life Sciences IT Environment Nanotech/Materials

Tokushima Health And Medicine Cluster

Tokushima

Creating new industries in health- and medicine-related fields, by using techniques to analyze disease-linked proteins and gene information and establishing a Tokushima model to predict and prevent lifestyle-related diseases such as diabetes

Cluster Vision

The Tokushima region has adopted a vision to create a health and medicine cluster focusing on health technologies. Using the innovative disease-linked proteins and gene information analysis techniques of the University of Tokushima as fundamental technologies, we have worked to create such a health and medicine cluster, specifically through creation and concentration of research support industries that are needed in the post-genome age particulary in pharmaceutical development and regenerative medicine.

In the knowledge cluster initiative, we are forging ahead with R&D with the aim of helping sufferers of lifestyle-related diseases with a specific emphasis on diabetes, which is a problem both in the Tokushima region and internationally. In particular, we are aiming to establish a concentration of various health- and medicine-related industries ranging from functional foods to pharmaceutical development.

Project Overview

Aiming to develop various technologies related to analysis of disease-linked proteins and genetic information, we have conducted joint research in Tokushima in the fields of proteomics, chiefly involving the Institute for Enzyme Research at the University of Tokushima, and in genomics, chiefly involving the Institute for Genome Research and Faculty of Engineering at the University of Tokushima. By forming tie-ups in each of these fields, we are making progress in developing analysis tools such as biochips and finding information necessary for pharmaceutical development and diagnostics.

We are also conducting research into diagnosis of diabetes and other lifestyle-related diseases and developing drugs for their treatment. Furthermore, we are making headway with an obesity research project on a system to collect, analyze and evaluate human visceral fat cells and are proceeding with joint research into functional foods that use local ingredients from Tokushima.

- Development of disease-linked proteomics and genomics basic technologies and applied research
  Development of next-generation diamond coating high-density integrated DNA chip technology and applied medical research
- Obesity research project
  Determining factors related to obesity using human fat cells and uses of those factors
- Joint research to predict and prevent diabetes and other lifestyle-related diseases
  Discovery of new serum markers for diabetes and clinical use of those markers
- Joint research to enhance food functions and develop a diagnosis system
  Development of a system to help evaluate masticatory function
  Development of functional foods to prevent infections

Tokushima Prefecture has a major challenge on its hands—ending its lead in death rates from diabetes among different prefectures in Japan, where it has been for the last 14 years straight. The prefecture, academia, medical institutions and companies are making a concerted effort to create a system that will enable patients to fight diabetes. The knowledge cluster initiative also plays a role in R&D in relation to this.

Project Director
Akihiro Nabeshima

Consultant for Otsuka Pharmaceutical Factory Co., Ltd.

Creating a health and medicine cluster focused on health technologies

With the ongoing aging of the population, we need safe social and medical systems that keep us free from illness so that everyone can enjoy a healthy, active and rich life for many years to come.

In the Tokushima region, applied research has been carried out in proteomics and genomics. Specifically, work has been done to develop disease-linked proteins and genetic information and research has been conducted to put this technology to use.

Based on such research, a variety of other work is being carried out, including searching for diagnostic markers to prevent lifestyle-related diseases such as diabetes and obesity, commercializing the results of this work, and R&D of a search system for use in pharmaceutical development, and development of functional foods with a focus on safety and peace of mind.

Unfortunately, Tokushima has had the highest death rate from diabetes of any prefecture in Japan for all of the last 14 years. The region must rectify this problem as soon as possible. To achieve this aim, industry, academia and government have pooled their wisdom, concentrating on the Diabetes Countermeasures Center set up at the University of Tokushima. A regional medical network has also been developed to fight diabetes.

As this network expands and research findings are commercialized, we are aiming to create new industries and thereby establish the Tokushima model—a health and medical cluster unparalleled in all of Japan.

Cluster Headquarters

- ○President……Kamon Iizumi (Governor, Tokushima Prefecture)
- ○Vice President……Toshihiro Aono (President, The University of Tokushima)
- ○Project Director……Akihiro nabeshima (Consultant, Otsuka Pharmaceutical Factory, Inc.)
- ○Chief Scientist……Yoshimitsu Nagao (Vice-President, The University of Tokushima)
- ○Directors of Industry Academia & Government Cooperation…Koichi Sasagawa(CEO, Tokushima Industrial Promotion Organization)
  Masayuki Shibuya(Guest Professor, The University of Tokushima)
  Hideo Saito(Director, Tokushima Prefecture)
- ○SCIENCE and Technology Coordinator…Hiroshi Tomita, Yuichi Saito

Core Organization

Tokushima Industrial Promotion Organization

Participating Research Organizations (Bold: Core Research Organization)

Industry…ALOKA Co., Ltd., Medical & Biological Laboratories Co., Ltd., Oji paper Co., Ltd., Otsuka Pharmaceutical Co., Ltd., TAIHO Pharmaceutical Co., Ltd., Hitachi High-Tech Fielding Corporation, Fukae Kasei Co., Ltd., Fuji Film Co., Ltd., Hokkaido System Science Co., Ltd., Mitsubishi Chemical Corporation, etc.

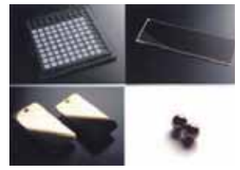
Academia…**The University of Tokushima,** Tokushima Bunri University, Hokkaido University, Shiga University of Medical Science, Osaka University of Pharmaceutical Sciences, Ehime University, Kumamoto University

Government…Tokushima Prefectural Industrial Technology Center, National Institute Of Advanced Industrial Science And Technology

Main Results

- Development of a comprehensive food allergies diagnostic chip (protein chip) using a diamond-like carbon (DLC) chip

  Allergies affect so many people in Japan from infants to the elderly that they are referred to as a national disease. We have developed a high-performance, comprehensive allergen and epitope chip to accurately determine allergens and perform desensitization treatment. One particular feature of the chip is that only a minute volume of blood, 20 µl, is required to test for some 400 to 600 allergens and corresponding epitopes. Furthermore, saliva, tears or nasal discharge can also be used for analysis instead of blood. The device we have developed provides detailed, accurate information about the cause of allergies and other aspects of body allergies just from one drop of blood taken from the earlobe or a fingertip or alternatively from saliva. Allergy sufferers are spared the pain associated with giving a conventional blood sample. Going forward, we aim to develop a chip and system capable of diagnosing pollen allergies, atopic dermatitis, drug allergies, and allergic asthma within 1 to 2 hours.



DLC chip

- Commercialization of automatic whole mount in situ hybridization (WISH) processing device

  We have completed an automatic WISH processing system that can be used to automatically investigate gene expression. The system provides the highest quality data and allows the InSitu chip and capsule to be used. If a system were developed to analyze gene expression patterns fully and automatically using WISH and ISH by means of an automatic cutting device currently in development, substantial cost savings could be achieved.

Automatic WISH processing device